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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,860	01/02/2001	Nobuaki Hashimoto	108102	8268

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EXAMINER

THAI, LUAN C

ART UNIT PAPER NUMBER

2827

DATE MAILED: 10/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/720,860

Applicant(s)

HASHIMOTO, NOBUAKI

Examiner

Luan Thai

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 12-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 27-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office action is responsive to the amendment filed July 25, 2002.

Claims **1-31** are pending in this application.

Claims **12-26** have been withdrawn from consideration as being directed to a non-elected invention.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1, 3, and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Tallaksen (5,255,430).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 1, 3, and 29-31, Tallaksen discloses (see specifically figures 3-7) a semiconductor device comprising: a semiconductor chip 96 on which a plurality of electrodes 98-116 are formed (see figure 6); a first flexible

substrate 48 on which a wiring pattern 70-78 is formed and on which the semiconductor chip 96 is mounted (see figures 3-4); a plurality of external terminals 50-64 electrically connected to the electrodes with the wiring pattern interposed; a second flexible substrate 92 adhered to the first flexible substrate 48 avoiding the semiconductor chip 96; wherein the external terminals 50 are provided to be connected with the wiring pattern 70-78 via a plurality of through holes 80-88 formed in the first flexible substrate 48, and wherein the external terminals 50 project from a surface of the first flexible substrate 48 opposite to a surface on which the wiring pattern 70-78 is formed. Although Tallaksen does not explicitly disclose the first flexible being formed of a material having a coefficient of thermal expansion substantially equal to a coefficient of thermal expansion of a material of the first flexible substrate, this feature is taken to be inherent in Tallaksen's device, since a means of the first flexible substrate 48 being formed of the same material as the second flexible substrate 92 is disclosed (Col. 4, lines 60+).

3. Claims 1-3, 10-11 and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Baxter et al. (5,926,696).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 1-3, 10 and 29-31, Baxter et al. disclose (see specifically figures 3-5) a semiconductor device comprising: a semiconductor

chip 3 on which a plurality of electrodes are inherently formed for wires 17 electrically bonded to; a first flexible substrate 5 of plastic material on which a wiring pattern 10-14 is formed and on which the semiconductor chip 3 is mounted; a plurality of external terminals 19 electrically connected to the chip's electrodes with the wiring pattern interposed, wherein the device is electrically connected to a circuit board via the external terminals 19 (Col. 2, lines 50+); a second flexible substrate 7 of the same material and substantially the same thickness (see figure 4) adhered to the first flexible substrate 5 (via adhesive 6) avoiding the semiconductor chip 3, wherein the external terminals 19 are provided to be connected with the wiring pattern 10 via a plurality of through holes 15 formed in the first flexible substrate 5, and wherein the external terminals 19 project from a surface of the first flexible substrate 5 opposite to a surface on which the wiring pattern 10 is formed. Although Baxter et al. do not explicitly disclose the first flexible being formed of a material having a coefficient of thermal expansion substantially equal to a coefficient of thermal expansion of a material of the first flexible substrate, this feature is taken to be inherent in Baxter et al.'s device, since a means of the first flexible substrate being formed of the same material (e.g., plastic material) as the second flexible substrate is disclosed (Col. 2, lines 18+).

Regarding claim 11, Baxter et al. further disclose the semiconductor device being used in an electronic instrument (Col. 1, lines 6+).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tallaksen (5,255,430) in view of Plepys et al. (6,140,707 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 8, Tallaksen discloses all the limitations of the claimed invention as detailed above except for an anisotropic conductive material being used for making electrical connection between the chip's electrodes and the wiring pattern, and for bonding the first and second substrates together.

Plepys et al. while related to a similar package design teach that electrodes 36 of the semiconductor chip 32 can be electrically connected to the wiring pattern 62 by an anisotropic conductive material having electrically conductive particles dispersed in an adhesive; wherein the first and second flexible substrates 50-52 are adhered to each other by the anisotropic conductive material, and the anisotropic conductive material is in close contact with a surface of the wiring pattern facing the second flexible substrate and edge surface of the wiring pattern (Col. 9, lines 30+ and 45+). It would have been

obvious to one of ordinary skill in the art at the time the invention was made to apply an anisotropic conductive material in Tallaksen's device for making electrical connection between the chip's electrodes and the wiring pattern and for bonding the first and second substrates together, since such application is conventional in the art as taught by Plepys et al.

6. Claims 1-7, 9-11, and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama (6,324,067) in view of Degani et al. (5,646,828 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 1-4, 6-7, 9, 11, 28-29 and 31, Nishiyama discloses (see specifically figure 10) a semiconductor device comprising: a semiconductor chip 4 on which a plurality of electrodes 12 are formed; a first wiring substrate 1' on which a wiring pattern 3b is formed and on which the semiconductor chip 4 is mounted; a plurality of external terminals 3, which are formed on the bottom surface of the first substrate 1' and electrically connected to the electrodes 12 with the wiring pattern 3b interposed; a second wiring substrate 1 adhered to the first wiring substrate 1' avoiding the semiconductor chip 4; a conductive layer 3a formed between the first and the second wiring substrates 1'-1, of the same material and substantially the same thickness as the wiring pattern 3b, and is electrically insulated from the wiring pattern 3' by a first insulating layer 1b (formed on a surface of the wiring pattern 3b) and a second insulating layer 1a

(formed on a surface of the conductive layer 3a) (see figure 10). Nishiyama further discloses the semiconductor device, as detailed above, being used in an electronic instrument (see the Abstract). Nishiyama does not explicitly teach the wiring substrates 1'-1 being flexible substrates.

A wiring substrate being flexible, however, is conventional in semiconductor art, as disclosed by Degani et al. (Col. 8, lines 12+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use flexible substrates in Nishiyama device since flexible substrate is conventional in the art, as taught by Degani et al. In addition, the first and second substrates 1' and 1 could be considered to be flexible because both substrates are made of thin epoxy resin layer (Col. 2, lines 9+ and Col. 4, lines 19+), and it is apparent that a thin epoxy resin layer must have at least a number of flexibility.

Regarding claims 5-6, the limitation of "the means of adherence of the first substrate and the wiring pattern, and the means of adherence of the second substrate and the conductive layer are the same" is taken to be inherent in the proposed device of Nishiyama and Degani et al. since Nishiyama does disclose the first and second flexible substrates being formed of the same material (e.g., epoxy resin, Col. 4, lines 18+) and having the wiring pattern 3' and the conductive layer 3" respectively formed thereon by the same method (e.g., laminating, printing, Col. 4, lines 20+).

Regarding claims 10, 27 and 30, although the proposed device of Nishiyama and Degani et al. does not explicitly disclose that the semiconductor device being mounted on a circuit board, this limitation is taken to be inherent in the proposed device of Nishiyama and Degani et al., since a means of external terminals (3) of the device is disclosed and it is apparent that some type of circuit board must exist for the device getting I/O signal and power supply to function as intended.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama (6,324,067) in view of Degani et al. (5,646,828 of record) and further in view of Plepys et al. (6,140,707 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 8, the proposed device of Nishiyama and Degani et al. discloses all the limitations of the claimed invention as detailed above except for an anisotropic conductive material being used for making electrical connection between the chip's electrodes and the wiring pattern, and for bonding the first and second substrates together.

Plepys et al. while related to a similar package design teach that electrodes 36 of the semiconductor chip 32 can be electrically connected to the wiring pattern 62 by an anisotropic conductive material having electrically

conductive particles dispersed in an adhesive; wherein the first and second flexible substrates 50-52 are adhered to each other by the anisotropic conductive material, and the anisotropic conductive material is in close contact with a surface of the wiring pattern facing the second flexible substrate and edge surface of the wiring pattern (Col. 9, lines 30+ and 45+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply an anisotropic conductive material in the proposed device of Nishiyama and Degani et al. for making electrical connection between the chip's electrodes and the wiring pattern and for bonding the first and second substrates together, since such application is conventional in the art as taught by Plepys et al.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is (703) 308-1211. The examiner can normally be reached on 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Luan Thai
October 18, 2002

Albert W. Paladini 10-18-02
ALBERT W. PALADINI
PRIMARY EXAMINER